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ABSTRACT

Rates and severity of underemployment among a sample of college graduates were assessed using objective and subjective measures. Attention was directed to job characteristics related to underemployment, gender differences in the characteristics, and the effect of college type attended, college major, and academic performance. The data were drawn from two sources: (1) 9,039 responses to both the Cooperative Institutional Research Program's 1970 freshman norms survey and the 1977 followup survey on education, work, and leisure; and (2) the Department of Labor's "Dictionary of Occupational Titles," which rates 12,099 occupations on 44 characteristics. The data confirm previous findings that underemployment among college graduates is widespread, both in terms of the skills actually utilized by their jobs, and in terms of subjective assessments. While neither women nor blacks were disproportionately underemployed, white males retained a distinct advantage in terms of earned income. Higher levels of income were obtained by those attending private universities, and engineering and business majors earned the most money. Finally, characteristics that were found to be related to underemployment indicated a mismatch between higher education and jobs available for college graduates. (SW)

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UNDEREMPLOYMENT AMONG COLLEGE GRADUATES

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This paper was presented at the Annual Meeting of the Association for the Study of Higher Education held at the Washington Hilton in Washington, D.C. March 25-26, 1983. This paper was reviewed by ASHE and was judged to be of high quality and of interest to others concerned with the research of higher education. It has therefore been selected to be included in the ERIC collection of ASHE conference papers.

ABSTRACT

Rates and severity of underemployment among a sample of college graduates is assessed using both objective and subjective measures. Job characteristics related to underemployment are identified, and gender differences in the characteristics are examined. Results indicate widespread underemployment among recent college graduates. Divergent patterns of association between underemployment and job characteristics are found for women and men.

There is growing concern among educators, researchers, and the public at large that the great American education boom has been vitiated by the failure of job quality to keep pace with the increasing skills of workers. While the educational attainment of Americans has soared in recent decades, the utilization of education by existing occupations has changed very little in the same period (Rumberger, 1981). Whether the resultant underutilization of education is viewed as "overeducation" or "underemployment", research shows that the problem is widespread.

Duncan and Hoffman (1981)[1], comparing individuals' educational attainment with self-reports of the formal educational requirements of their jobs, estimated the underemployment rate to be about 40%. Similarly, over a third of Haines and Quinn's (1979) respondents reported having skills which were not used in their jobs. Comparing the distribution of educational attainment among workers with that of the educational requirements of occupations[2], Berg et al.(1978) found an underemployment rate of 13%. Using incumbents' median years of education as the measure of an occupation's educational requirements, the figure increased to 25%. The average number of years of underemployment was estimated at 1.8 by Duncan and Hoffman and at .64 by Rumberger, who used GED as the indicator of educational requirements.

While the preceding figures refer to the entire U.S. working population, most of the concern regarding underemployment has, with good reason, focused on the college-educated population. The acquisition of a college degree is a costly enterprise usually undertaken with at least the expectation, and often the primary purpose, of acquiring a higher paying, more prestigious, or more challenging or interesting job than would be obtainable without a college degree. The growing number of Americans making such an investment of time and money (college attendance increased threefold between 1960 and 1976) makes the underemployment of college graduates a problem of particular social significance.

Rumberger found underemployment to increase dramatically with level of education. Whereas he estimated mean years of overeducation to be .64 for the general working population, the comparable figures for those with 16 years of education were 2.13, 2.29, 1.88, and 1.49 for white men, black men, white women and black women, respectively. Berg et al., comparing GED with education, found 59% of those with 16 years of education to be underemployed, compared with 13%, as reported above, for the general population. Comparing educational attainment with the median education of occupations' incumbents, the same researchers found 64% of those with 16 years of education to be underemployed compared with 25% for the general population. At variance with the preceding results are those of Duncan and Hoffman, who found those with a college degree to be slightly less likely (36%) to

to be underemployed than the general working population (40%). Forty-four percent of Ochsner & Solmon's (1979) college educated sample described themselves as "underemployed."

Given that three of the four methods employed showed college graduates to be dramatically more underemployed than the working population at large, while the remaining method showed only a slight difference in the opposite direction, it is probably safe to say that underemployment is more prevalent among college graduates than among the population at large. However, even if college graduates were no more likely to be underemployed than those with less education, underemployment among college graduates deserves more serious consideration as a social problem because of the high costs and expectations attending college education. If in fact 64%, 59% or even 36% of college graduates fail to find jobs utilizing their hard-won education, prospective college students may reasonably wonder whether the non-job-related benefits of college will justify their substantial investment in years and dollars.

Aside from the overall rates and breakdowns by educational level reported above, incidence and magnitude of underemployment have been broken down by length of job tenure, pre-employment experience, and general occupational categories (Duncan and Hoffman 1981). Perhaps the most detailed examination of the problem has been carried out by Ochsner and Solmon (1979) and by Solmon (1981), who have related several subjective measures of underemployment to

college major, occupation, relatedness of major to job, and job satisfaction. The present study extends existing research on underemployment in two ways. First, while previous studies have used either objective or subjective indicators of underemployment, we use both a subjective measure of underemployment used by Ochsner and Solmon and an objective measure of underemployment similar to those used by Berg et al., Rumberger, and others. The use of two measures not only allows us to assess the relationship between objective and subjective underemployment but lends greater validity to our findings. Second, the data set compiled for this study includes both subjective and objective characteristics of respondents' jobs. These data enable us to describe the occupations of the underemployed in greater detail than has previously been possible and allow us to assess the relationship between underemployment and a number of occupational characteristics.

Job characteristics are relevant to a second social problem which has stimulated a substantial amount of research in recent years, that is, occupational differences between women and men. It has been well documented that men earn substantially more money than women (Cohen, 1971; Suter and Miller, 1973; Treiman and Terrell, 1975b; Young, 1977). However, it has also been shown that women and men do not differ significantly in terms of job status or prestige (Treiman and Terrell, 1975a; Featherman and Hauser, 1976; McClendon, 1976). Further, by both subjective and objective

measures, men are somewhat more likely to be underemployed than are women (Berg, et al., 1978, Duncan and Hoffman, 1979, Ochsner and Solmon, 1979; and Rumberger, 1981). The fact that traditional variables have failed to explain the gender difference in earnings suggests that a more detailed examination of differences in men's and women's occupations may be a fruitful area of research. Roos (1981) used job characteristics other than status and prestige to explain 13% of the earnings gap between men and women. In the case of underemployment there is no gender gap to explain. Our research attempts, rather, to identify job characteristics which are differentially related to underemployment for men and women.

DATA AND METHODS

Data

The data for the present study were drawn from two sources:

1) the Cooperative Institutional Research Program's (CIRP) 1970 freshman norms survey and the 1977 follow-up survey on education, work and leisure. 9,039 people, who attended colleges throughout the country, responded to both surveys. The response rate for deliverable questionnaires was slightly over 40%. For the present study, the sample was limited to full-time workers who had received a bachelor's degree only. The 348 respondents who reported being underemployed by preference were included in the computation of overall rates and magnitudes of underemployment (Tables 1 and 4a), but to avoid ambiguity, were excluded from the other analyses. The

final sample consisted of 2,533 respondents.

2) The Fourth Edition Dictionary of Occupational Titles (DOT), published by the U.S. Department of Labor. The DOT rates occupations on 44 characteristics including aptitudes, education and training, environmental conditions, physical and behavioral demands, and preferences and temperaments adaptive for job performance. Ratings were determined by on-site observations, and are provided for 12,099 occupations. The data have also been aggregated to coincide with 1970 census occupational categories.[3] This aggregated data set was used for the present research.

Procedures and Measurement of Variables

To merge the two data sets, census occupational categories were aggregated to conform with 39 occupational categories from the CIRP survey. DOT variables were appropriately weighted for the aggregation.

Subjective underemployment is measured as response to the question: "Considering your ability, education, and experience, are you underemployed in your current position?" The objective measure of underemployment involves translating the DOT variable, general educational development (GED, see footnote 2) into equivalent years of schooling. The conversion used here is the more conservative of the two most commonly used conversions; that is, it results in lower estimates of underemployment (Rumberger, 1981). Years of underemployment is then computed by subtracting years of schooling required by the

occupation from 16, the number of years usually taken to obtain a bachelor's degree.

The indicators of objective job characteristics, from the DOT, measure behaviors, aptitudes and temperaments required by an occupation, as well as preferences adaptive to job performance. Because the DOT occupational categories were aggregated, all DOT variables are in the form of means for each occupation and are therefore treated as continuous variables. Subjective job characteristics are taken from the CIRP survey. Respondents were asked to identify the characteristics that applied to their current positions.

EXTENT AND SEVERITY OF UNDEREMPLOYMENT

Table 1 reports the percent of our sample describing themselves as underemployed and the mean years of underemployment for our sample as a whole, as well as for several sub-groups. Almost 44% of the entire sample report being underemployed, and the objective measure suggests that the average respondent has 2.88 more years of schooling than needed to perform his or her job. While these figures may appear strikingly high, they are comparable to those reported by other researchers. It should be noted, however, here and throughout Table 1, that most of our respondents would have been in the work force for no more than three years at the time of the survey. Presumably many of them will move to higher GED jobs, and perceive themselves as being less underemployed, as their careers progress. Comparing the general working population with the inexperienced work

force, Rumberger (1981) found the inexperienced group to be approximately one year more underemployed than working people as a whole.

Table 1 about here

While the two measures of underemployment produce slightly different rank-orderings of the area majors, they both show that social science, humanities and business majors are most likely to be underemployed, and that engineering, education and physical science majors suffer less from underemployment. The variation in underemployment between majors is quite substantial. On the subjective measure, only about one-fourth of the education majors described themsleves as underemployed, compared with over half of the humanities majors. While the engineering majors report more subjective underemployment, the objective measure suggests that their education is actually utilized to a greater extent than that of the education majors.

It is interesting to note that, for our sample, women and blacks, two groups traditionally discriminated against in the job market, are no more severely underemployed than their male and white counterparts, respectively. Nor are these findings specific to college graduates. Rates of underemployment in the general working population do not

differ greatly by race or gender (Duncan and Hoffman, 1976; Berg et al., 1978; Rumberger, 1981). Since our data and recent census findings show college-educated blacks to be earning about the same as whites, lower average incomes for blacks in the general population may be attributable to lower educational attainments. We find no indication that lower incomes are due to objective underemployment, even though blacks are somewhat more likely to feel subjectively underemployed.

Table 2 about here

From Table 2a, it is apparent that women earn substantially less than men in their early careers, even though they are less underemployed both subjectively and objectively. However, while underemployment cannot explain sex or race differences in income, Table 2b shows that it is moderately related to income within gender groups.

A question might be raised here as to the degree to which subjective judgments of underemployment match the reality of an individual's occupational situation. Overall, a moderate relationship is found (r=.38) between the subjective and objective measure, with women showing somewhat more consistency (r=.45) than men (r=.30).

JOB CHARACTERISTICS AND UNDEREMPLOYMENT

The job characteristics taken from the DOT have been aggregated by occupation and therefore indicate the percentage of an occupational group likely to encounter each characteristic. By weighting these aggregations by the occupational distribution of our sample, and by assuming that our respondents are distributed within an occupational grouping in roughly the same manner as the other incumbents of those occupations, we are able in Table 3 to report the probability that the jobs of our respondents are marked by specific characteristics.

Table 3 about here

The characteristic most likely to be encountered by our college graduates is talking (p=.79), with the subjectively underemployed less likely than the fully employed to be in a job for which talking is an important characteristic (p=.70 versus p=.84). Repetitive work and a preference for routine, two characteristics which one would expect to be related to underemployment, are not frequently encountered by our sample (p=.06 and p=.13, respectively), but when they are components of a respondent's job, he or she is

considerably more likely to report underemployment.

Other characteristics which show important relationships with full employment are direction, judgment, data preference, and a preference for working for the good of people. Perhaps surprisingly, jobs which involve a preference for business contact with people are much more likely to be held by the underemployed (p=.40) than the fully employed (p=.25). Also surprisingly, respondents for whose jobs a preference for prestige is adaptive (23%) are no less likely to be underemployed than the rest of the sample.

Table 4 permits us to assess and compare the relationships of a larger number of occupational characteristics with indicators of both subjective and objective underemployment. Because total effects seem more appropriate for a first examination of the data, and because of a complex pattern of multicollinearity, correlations are reported in preference to regression coefficients. However, multiple correlations of related groups of characteristics with objective and subjective underemployment, as well as overall levels of explained variance, have been included.

Table 4 about here

Subjective characteristics of jobs and adaptive preferences are the two categories of job traits most related to

subjective underemployment. Not surprisingly, insufficient skill utilization and a preference for routine show the strongest relationships to subjective underemployment. Also as would be expected, physical demands are positively related, and intellectual demands are negatively related to both subjective and objective underemployment. However, unlike various measures of coordination and dexterity, a job's requirement for physical strength shows no overall relationship to subjective underemployment, even though it is related to objective underemployment.

Cognitive requirements are most highly related to objective underemployment, reflecting the fact that objective underemployment is partially definable in terms of intellectual skills. Other important characteristics are decision-making, which is highly related to full employment, and business preference, which is predictive of objective underemployment.

Sex Differences

Referring back to Table 3, we find that women are less likely (p=.39) than men (p=.54) to hold jobs demanding direction, control and planning, i.e., managerial positions. Instead, they are more likely to hold jobs which require talking (p=.82), and jobs for which a preference for working with data (p=.55) or for the good of people (p=.46 versus .16 for men) are adaptive. The last finding reflects, in part, the high concentration of women in teaching and nursing professions. Men are much more likely (p=.34) than

women (p=.19) to hold jobs for which a scientific preference is adaptive.

Table 5 indicates a somewhat divergent pattern of relationships between job characteristics and underemployment for men and women. Job characteristics explain more of the variance in perceived underemployment for women (40%) than for men (27%). Repetitious work, physical demands, and business preference are significantly more related to perceived underemployment for women than for men. Jobs requiring talking, making decisions, and preferences for working for the good of people and for working with data are significantly more related to the perception of full employment for women than for men. Status is the only subjective job characteristic which is more important for men than for women in determining a perception of full employment.

Numerical aptitude, direction-control-and-planning, and scientific and creative preferences are more central to objective full employment for men, while decision-making, talking, and good-of-people preference are more related to objective full employment for women. Precise working standards are associated with full employment for men, but are an important indicator of underemployment for women. Most physical demands are strongly related to objective underemployment, more so for women than for men.

It is interesting to note that men in occupations which are mostly male are more likely to be objectively fully

employed, but there is very little similar advantage for women (r=.06) to be employed in a male-dominated occupation.

CONCLUSIONS

Our data confirm previous findings that underemployment among college graduates is widespread, both in terms of the skills actually utilized by their jobs and, perhaps more importantly, in terms of their subjective assessments. While income and objective underemployment are both related to job satisfaction (r=.21 and -.28, respectively), the correlation between subjective underemployment and job satisfaction is -.55. Thus, any assessment of the satisfaction of workers must weigh heavily the actuality and, especially, the perception of underemployment.

While we may take some comfort from the fact, confirmed here, that neither women nor blacks are disproportionately underemployed, it remains true that white males retain a distinct advantage in terms of earned income.

Our findings on the relatedness of job characteristics and underemployment, generally confirm common-sense notions; the occupations of the underemployed are most likely to be characterized by physical activities and requirements, and least likely to involve cognitive activities and aptitudes. Less obvious are some of the sex differences in the characteristics most related to underemployment. Such differences may provide a fruitful source of information for further research into occupational sex differences and

sex discrimination.

The characteristics which we have found to be most related to underemployment, whether for men or women, describe in a very specific way the mismatch between higher education and jobs available for college graduates. For those who are underemployed, these characteristics represent the skills which college has provided but which lie fallow on the job, as well as the skills and activities required by their jobs to which their college education was irrelevant. Any attempt to improve the match between education and work should take account of these characteristics.

The present research has addressed education solely in terms of its relationship to employment. However, implicit in our choice of the term "underemployment" instead of the more widely used term "overeducation" is an orientation which places primacy on education, and a belief that the more desirable solution to the problem involves a change in the occupational structure, not a reduction in college attendance or a "vocationalization" of the college curriculum. We believe that the rewards of college education extend far beyond its utility in the job market, and that college attendance is worthwhile regardless of later occupational outcomes.

Despite this bias, we believe that attention to the occupational outcomes of college is important for at least two reasons. First, there are undoubtedly many prospective college students who do not share our belief in the intrinsic

value of education. Those who view college primarily as a boost up the occupational ladder have a right to know how great a boost their education is likely to provide. To this end, information such as that presented here may help potential college students decide whether to make the investment in a college education, and it may guide those who have already enrolled in college to choose a major which is likely to lead to a job utilizing their education. Solmon (1981) reports the distributions of probable majors reported by entering freshpersons from 1970 to 1979. These figures show a decline in the arts and humanities, the social sciences, education and mathematics, and an increase in the percent intending to become engineering and business majors. As Solmon points out, these trends suggest that college students in the seventies were attempting to adjust to the job market by choosing majors they hoped would lead to better jobs. Ironically, to the extent that their aim was to find a job which would utilize their education, many of those students may have been making the wrong choices. In 1977, education majors were actually among the least underemployed, and business majors were among the most underemployed. Our findings suggest that major and career choices might often be based on incorrect notiors of occupational outcomes. More effort should be made on the part of educators, researchers and the media to provide the public with information on the utilization of education in the workplace.

Such information would provide a needed balance to the present emphasis on the pecuniary rewards attending various occupational choices.

Our final argument for the importance of this research involves the perhaps utopian belief that work should be rewarding, interesting and challenging for all people. Social change, even on a small scale, is very difficult to bring about purposefully, and a major upgrading in the skill utilization of occupations is a tall order indeed. But if such change is ever to be brought about, identification and description of the problem, such as we have attempted here, will have been the first step.

FOOTNOTES

1 All data reported on underemployment were collected in 1976 or 1977.

2 The indicator of educational requirements was General Educational Development (GED), one of the variables included in the Dictionary of Occupational Titles, published by the U.S. Department of Labor (1977). All DOT variables are derived from on-site job observations. For the GED measure, occupations are rated on three six-point scales - reasoning, math and language. The highest score from the three categories is selected to express the occupation's GED.

3 See Cain and Treiman (1981) for a more detailed description of the content and production of the DOT.

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TABLE 1

Percent subjectively underemployed and mean years of objective underemployment for entire sample and by area major, race and gender.

	Percent underemployed (subjective)	Mean years underemployment (objective)
Total	43.8	2.88[1]
AREA MAJOR		
Physical sciences	44.1***	2.49***
Social sciences	53.0	3.54
Humanities	50.5	3.18
Education	24.3	2.19
Engineering	39.7	1.41
Business	47.6	3.57
GENDER		
Female	42.0*	2.85
Male	46.8	2.94
RACE		
Black	47.8	2.70*
White	43.4	2.91

* p=.05
*** p=.001

1 A less conservative but more widely used (Eckhaus, 1964; Scoville, 1966; Berg, 1970; Kalleberg and Sorensen, 1973; Rumberger, 1981) conversion of GED to years of schooling yields estimates of mean years of underemployment a full year higher than reported here, for all groups.

TABLE 2

Sex differences in levels of underemployment and income(a) and correlations between income and underemployment for women and men(b).

	Men	Women
Percent subjectively underemployed	46.8	42.0
Mean years objective underemployment	2.94	2.85
Mean income	$12,360	$10,575

(a)

	Subjective underemployment	Objective underemployment	Income
Subjective underemployment	1.00	.45	-.22
Objective underemployment	.30	1.00	-.21
Income	-.15	-.18	1.00

Women above diagonal

(b)

TABLE 3

Probability of job characteristics, for the full sample, for the subjectively underemployed and fully employed, and for men and women.

	Total	Underemployed	Fully employed	Men	Women
Direction,control,planning	45.8	50.5	37.4***	54.1	39.0***
Decisions based on judgment	59.4	66.4	47.3***	55.2	61.3***
Repetitive work	5.6	2.3	11.5***	5.8	6.1**
Precise working standards	36.2	30.5	46.2***	41.2	33.2***
Talking	79.0	83.9	70.3***	73.5	81.5***
Data preference	48.1	54.4	37.1***	36.1	55.2***
Scientific preference	25.6	28.0	21.3***	33.9	18.9***
Creative preference	6.3	6.6	5.7	8.2	4.9
Routine preference	12.8	5.8	25.0***	12.7	14.1***
Good-of-people preference	34.5	44.3	17.4***	16.0	45.5***
Prestige preference	22.7	22.5	23.2	25.5	20.9***
Business preference	30.3	25.0	39.6***	35.6	27.7***

* p=.05
** p=.01
*** p+.001

TABLE 4

Correlations of job characteristics with subjective and objective underemployment for the full sample, for men and for women.

	Subjective underemployment			Objective underemployment		
PHYSICAL REQUIREMENTS: (OBJECTIVE)	Total	Men	Women	Total	Men	Women
Motor coordination	.28***[1]	.16	.36***[2]	.45***[1]	.19	.64***[2]
Manual dexterity	.23***	.17	.28*	.37***	.16	.52***
Finger dexterity	.24***	.11	.33***	.29***	-.01	.51***
Physical activity	.29***	.19	.36***	.46***	.28	.59***
Strength	.01	.14	-.08	.34***	.50	.22***
Multiple R	.31	.18	.42	.58	.56	.68
COGNITIVE REQUIREMENTS: (OBJECTIVE)						
Intellectual aptitude	-.31***	-.26	-.35*	-.93***	-.95	-.92***
Verbal aptitude	-.32***	-.26	-.37**	-.92***	-.94	-.91***
Numerical aptitude	-.14***	-.20	-.10*	-.58***	-.74	-.46***
Clerical perception	-.20***	-.22	-.18	-.41***	-.50	-.34***
Multiple R	.34	.27	.40	.95	.96	.93
BEHAVIORAL REQUIREMENTS: (OBJECTIVE)						
Direction,control,planning	-.20***	-.23	-.18	-.47***	-.55	-.41***
Decision-making	-.28***	-.20	-.34***	-.52***	-.39	-.61***
Talking	-.27***	-.14	-.36***	-.36***	-.16	-.50***
Precise standards	.20***	.01	.33***	.17***	-.18	.43***
Repetitive work	.39***	.27	.47***	.77***	.69	.83***
Multiple R	.41	.31	.49	.83	.82	.88
ADAPTIVE PREFERENCES: (OBJECTIVE)						
Scientific preference	-.08***	-.13	-.07	-.36***	-.53	-.22***
Creative preference	-.02	-.02	-.02	-.35***	-.43	-.28***
Good-of-people preference	-.28***	-.15	-.36***	-.39***	-.26	-.51***
Business preference	.18***	.11	.23***	.45***	.44	.45
Prestige preference	.00	.00	.00	-.10***	-.08	-.13
Data preference	-.21***	-.09	-.27***	-.32***	-.14	-.47***
Routine preference	.41***	.30	.49***	.83***	.81	.86***
Multiple R	.45	.33	.53	.92	.92	.94
SUBJECTIVE CHARACTERISTICS:						
Skills utilized	-.40***	-.37	-.42	-.24***	-.21	-.26
Decision-making	-.19***	-.15	-.22	-.08***	-.04	-.11
Sufficient status	-.34***	-.37	-.32	-.20***	-.21	-.19
Well-paid for education	-.16***	-.16	-.16	-.11***	-.11	-.11
Multiple R	.48	.46	.49	.31	.25	.34
Percent male incumbents	-.01	-.06	.03	-.15***	-.28	-.06***
Income	-.17***	-.14	-.20	-.18***	-.18	-.18
R^2	.34	.27	.40	.99	.99	.99

* p=.05 ** p=.01 *** p=.001

1 Significant correlation
2 Significant difference between correlations for men and women